



# MDC Resource Science

## Linking Wetland Management Decisions to Secretive Marsh Bird Habitat Use During Spring Migration

### Science Notes



American Bittern



Sora



Virginia Rail

# Linking Wetland Management Decisions to Secretive Marsh Bird Habitat Use During Spring Migration on Public Wetlands in Missouri

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**Background Information:** Several secretive marsh bird (SMB) species are listed as “Critically Imperiled” in Missouri; however, little information exists on SMB distribution and habitat use within the state. As a result, wetland managers are uncertain as to how much SMBs use Missouri wetlands and the wetland processes they need to emulate in order to provide habitat for this guild of species. For this Science Note, we focus on the migratory SMBs.

**Methods and Results:** To address these concerns, we designed and implemented a two year study (2013 and 2014) that included repeated call-back surveys to detect five SMB species (Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), king rail (*R. elegans*), least bittern (*Ixobrychus exilis*) and American bittern (*Botaurus lentiginosus*)) on 107 wetland units across 8 Conservation Areas and 4 National Wildlife Refuges throughout Missouri. We considered Virginia rail, sora, and American bittern primarily as migrants through Missouri, whereas we considered king rail and least bittern primarily as breeding in Missouri.

Wetland units were categorized as active or passive based on water-level manipulation strategies implemented each spring. Active sites were those in which managers manipulated a water control structure with the intent to draw down water levels on a given wetland, whereas water levels in passive sites were not manipulated. Water levels in either management category could fluctuate due to rain, floods, evapotranspiration, or soil infiltration. We stratified sampled wetlands by dominant vegetation communities and placed a SMB survey point within each. More details on study methods, results and discussion can be found in [Hill \(2015\)](#).

- We detected 909 sora, 254 least bittern, 181 American bittern, 99 Virginia rail and 9 king rail, during the spring migration period (early April through mid-May) indicating that Missouri’s public wetlands are being used as spring migration stopover locations.
- Water management only appeared to influence initial wetland occupancy by soras and bitterns. Soras keyed in on wetlands with slower drawdowns ( $\geq 100$  days), whereas least bittern preferred wetlands with later drawdowns (initiated in mid- to late-May). American bittern occupancy increased with slower drawdowns ( $>150$  days), later drawdowns (initiated in July), and deeper water ( $\geq 150$  cm) (Figure 1).
- Once birds occupied a wetland, vegetation characteristics were generally more important in predicting whether they pioneered into other wetlands. Sora appeared to prefer wetlands with denser vegetation and a higher percent coverage by emergent vegetation such as cattails or

bulrush, whereas Virginia rail and American bittern pioneered into wetlands with a 50:50 mix of open water to emergent vegetation.

**Management Implications:** This project addressed whether SMBs are using Missouri wetlands during spring migration; clearly they are.

- Water-level manipulation to promote moist-soil vegetative communities is likely compatible with habitat use by spring migrating sora, Virginia rail and American bittern; mean drawdown duration on wetlands with active water manipulation was 45 days and generally encompassed the five week migration window during which these migrants are in Missouri.
- Considerable uncertainty remains as to how SMBs use wetlands across the broader Missouri landscape (including wetlands on private land), movements among wetland habitats, and migration stopover duration. Additional investigation to address these questions would further inform management decisions targeted toward SMBs.

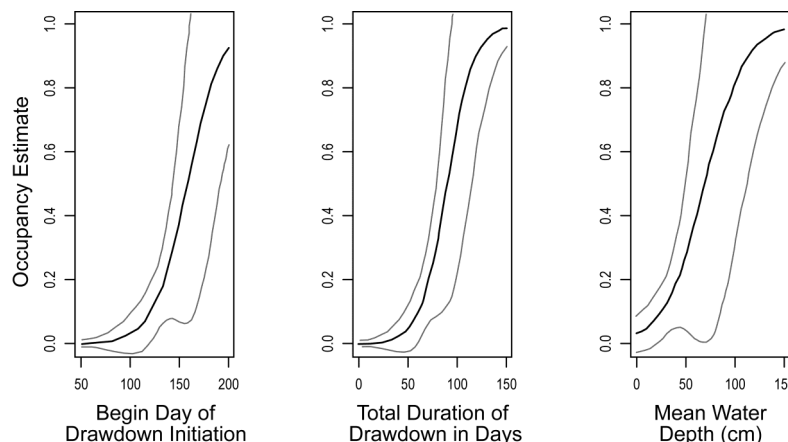


Figure 1 - Predicted American bittern (*Botaurus lentiginosus*) occupancy estimate as a function of the initiation date, the drawdown duration, and the average water depth (cm) at a site.

Citation:

Hill, E.B. 2015. Linking wetland management decisions to secretive marsh bird habitat use during spring migration and summer breeding on public wetlands in Missouri. M.S. Thesis. University of Missouri – Columbia. 117 pp+app.

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**Keywords:** rails, sora, Virginia rail, king rail, American bittern, least bittern, spring migration, migration, ecology, wetland, water-level manipulation